

AMAR  
CHITRA  
KATHA

# The Story of a Scientist

— YELLAPRAGADA SUBBAROW

o. 306 Rs. 3 50





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## **The Story of a Scientist**

Yellapragada SubbaRow was a 'rishi' of a scientist. If he is not as wellknown in our country it is because, like the 'rishis' of yore—of whom we know little—his pursuit of knowledge was free of ego. The man who discovered Aureomycin, the man who synthesized folic acid, the man who gave us Hetrazan never pushed himself into the glare of publicity. As the director of research his name should have been at least at the top of the team. But often it took its self-effacing niche in an alphabetical order.

Neither the lowly status of an Indian in the U.S.A. of the early twentieth century nor the demands of applied research stained the scholastic integrity of SubbaRow. Such was the strength of his moral fibre—a strength which distinguished his personal as well as his professional life.

Shri S. P. K. Gupta took thirteen years to write his biography of Yellapragada SubbaRow. It is now being published by Suparna Publications. 5-17 Sriramakrishnapuram, Hyderabad, Andhra Pradesh 500 035; in two volumes. Shri Gupta's research took him to the places and persons SubbaRow was associated with in India and the U.S.A. Shri Gupta is now in Moscow as the special correspondent of the P.T.I.

Editor

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# YELLAPRAGADA SUBBAROW

VENKAMMA WAS WORRIED. SCHOOL SHOULD HAVE GOT OVER HOURS AGO, BUT HER SON, SUBBAROW AND HIS COUSIN HAD NOT YET RETURNED HOME.



SHE WENT OUT IN SEARCH OF THE BOYS. AT THE NEAREST CART-STAND —

TWO BOYS ABOUT THIRTEEN YEARS OLD?

YES, ONE OF THEM IS MY SON. HAVE YOU SEEN THEM?

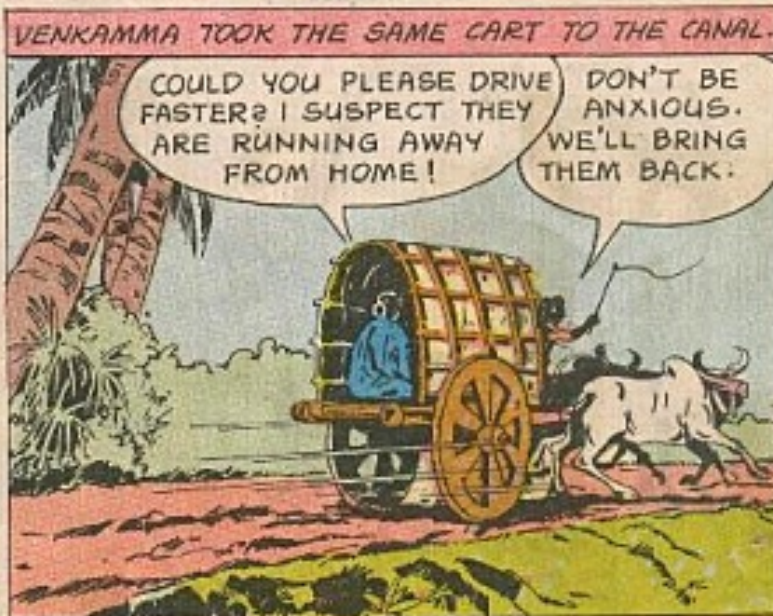


I TOOK THEM TO THE CANAL. I'VE JUST RETURNED FROM THERE. THEY WERE WAITING FOR THE BOAT GOING NORTH.

VENKAMMA TOOK THE SAME CART TO THE CANAL.

COULD YOU PLEASE DRIVE FASTER? I SUSPECT THEY ARE RUNNING AWAY FROM HOME!

DON'T BE ANXIOUS. WE'LL BRING THEM BACK.





WHEN THEY REACHED THE CANAL —

THE BOAT HAS LEFT.  
THEY'VE GONE.

DON'T WORRY. THE  
BOAT COULDN'T HAVE GONE  
VERY FAR. I'LL BORROW A  
BICYCLE AND GO AFTER IT.



THE CARTMAN SOON CAUGHT UP WITH THE BOAT.

PLEASE HALT. I WANT  
TO GET INTO THAT  
BOAT.



BOATS ON THIS CANAL WERE,  
AND STILL ARE, HAULED BY  
MEN TRUDGING ALONG THE  
BANK.

THE MEN PULLED THE BOAT TOWARDS THE  
BANK AND TIED THE ROPE TO A TREE. SOON —

COME ON, BOYS. YOU'RE  
GOING RIGHT BACK  
HOME.

NO!



AND SUBBAROW TRIED TO JUMP INTO THE  
WATER. BUT —

WE'RE NOT SWIMMING  
HOME, SON. WE'RE  
GETTING INTO  
ANOTHER BOAT.





AFTER THE CARTMAN HAD GOT SUBBAROW AND HIS COUSIN INTO A NARASAPURAM\*  
BOUND BOAT —



SUBBAROW WAS SILENT. HE DID NOT WANT TO TELL THE CARTMAN ABOUT HIS FATHER WHO WAS AILING AND JOBLESS.



HE DID NOT WANT TO SPEAK ABOUT THE MEagre MEAL THE FIVE CHILDREN HAD TO SHARE.



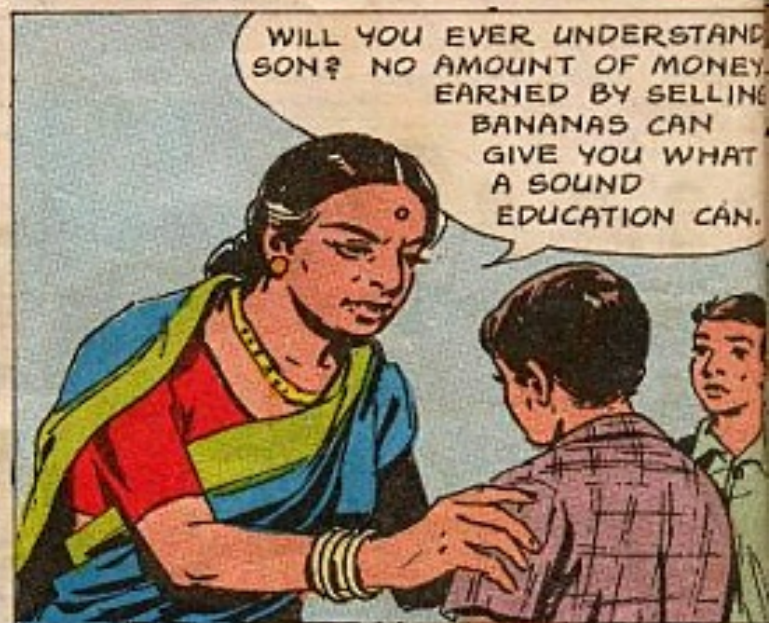
LEAST OF ALL DID HE WANT TO SPEAK ABOUT HIS GROWING RESENTMENT AGAINST HIS MOTHER.



SOON —







SUBBAROW TRIED HARD TO CONCENTRATE ON HIS STUDIES, BUT HIS MIND WOULD KEEP WANDERING.





FINALLY WHEN HE APPEARED FOR THE MATRICULATION EXAMINATION, HE FAILED. SO HE WAS SENT FOR A SECOND ATTEMPT TO RAJAHMUNDY, WHERE HIS BROTHER, PURUSHOTTAM, A SCHOOLTEACHER, LIVED.

THE ONLY SUBJECT I'M GOOD AT IS MATHEMATICS. I'LL NEVER PASS THIS EXAMINATION.

YOU WILL. DON'T LOSE HEART, SUBBUDU. THAT'S THE WORST THING YOU COULD DO TO YOURSELF.

LIFE IS FULL OF TESTS AND FAILURES. BUT THEY SHOULD ONLY GOAD YOU TO ACHIEVE WHAT YOU WANT.

PURUSHOTTAM WAS AN ACTIVE NATIONALIST. HIS HOME WAS A MEETING PLACE FOR THE FREEDOM-FIGHTERS OF THE TOWN.

SUBBAROW KEENLY FOLLOWED THE DISCUSSIONS. HIS INVOLVEMENT IN THE INTELLECTUAL FERMENT OF THE CITY LEFT HIM LITTLE TIME FOR STUDIES. AND HE FAILED AGAIN.

HE WENT TO MADRAS TO TRY A THIRD TIME. TWO MONTHS BEFORE THE EXAMINATION HIS FATHER DIED AND HE RETURNED HOME. CONDITIONS AT HOME WERE AT THEIR WORST. YET —

KEEP THIS MONEY FOR YOUR FARE BACK AND YOUR EXAMINATION FEE.

BUT HOW... WHERE...?

I SOLD MY GOLD ORNAMENTS.

MOTHER...!

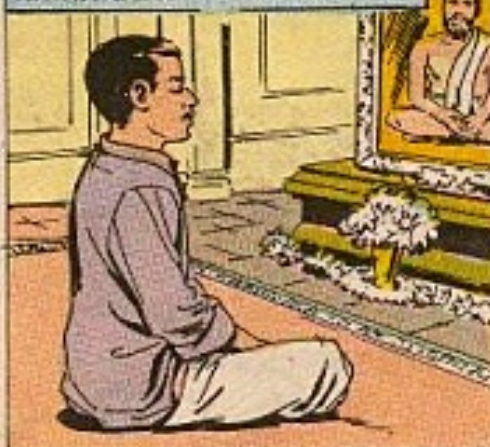
FOR THE FIRST TIME IN HIS LIFE SUBBAROW UNDERSTOOD HIS MOTHER.



THIS TIME HE PASSED THE EXAMINATION AND JOINED PRESIDENCY COLLEGE, MADRAS. IT WAS THE YEAR, 1913.



AROUND THE SAME TIME HE DEVELOPED AN INTEREST IN THE SPIRITUAL LIFE. HE STARTED VISITING THE RAMAKRISHNA MISSION.



WHEN HE PASSED THE INTERMEDIATE EXAMINATION —

I WILL NOW HAVE TO FIX MY GOAL IN LIFE.



ON THE FOLLOWING DAY, SUBBAROW WENT TO THE RAMAKRISHNA MISSION. HE HAD MADE HIS CHOICE.



SWAMIJI, I WANT TO BECOME A SANYASI.

WHAT FOR?





HE DID AND DECIDED TO JOIN THE MADRAS MEDICAL COLLEGE.  
HIS MOTHER WAS SURPRISED, BUT PLEASED.





AS MONTHS PASSED BY AND HE SAW MEN AND WOMEN SUFFERING AND DYING —

THE SWAMI WAS RIGHT. MAN MUST UNDERSTAND MANKIND BEFORE HE SEEKS TO UNDERSTAND GOD.



SUBBAROW WAS FIRED WITH A NEW ZEAL. HE PLUNGED INTO HIS STUDIES WITH RENEWED ENTHUSIASM.



ONE VACATION WHEN HE CAME HOME —

SUBBUDU... I... YOU KNOW THE KASTURY FAMILY HAS BEEN HELPING YOU WITH YOUR FEES.



SUBBUDU... I... YOU KNOW THE KASTURY FAMILY HAS BEEN HELPING YOU WITH YOUR FEES.



THEY HAVE SEVERAL UNMARRIED DAUGHTERS. I WANT YOU TO MARRY ONE OF THEM.

MOTHER, IF I MARRY A RICH MAN'S DAUGHTER, I WILL BE EXPECTED TO MAKE MYSELF RICH, TOO, BY ANY MEANS!



NO, MOTHER, I AM NOT INTERESTED. I DO NOT WANT TO RUN AFTER RICHES.





EVENTUALLY, HOWEVER, HE WAS PERSUADED TO MARRY SESHAGIRI, ONE OF THE DAUGHTERS. THE WEDDING TOOK PLACE IN 1919.



AFTER THE WEDDING, SUBBAROW RETURNED TO COLLEGE. IT WAS NOW HIS FOURTH YEAR.

IN AUGUST 1920, GANDHIJI LAUNCHED THE NON-COOPERATION MOVEMENT.



SUBBAROW SUPPORTED IT BY WEARING KHADI SURGICAL GOWNS.

A KHADI GOWN! FANCY THAT! DO YOU THINK MR. GANDHI WILL BECOME THE NEXT VICEROY?

NO, SIR. I DON'T THINK HE WOULD CONDESCEND TO BECOME ONE, SIR.



LATER—

SUBBAROW, DR. BRADFIELD DIDN'T LIKE YOUR RETORT.

HE ASKED FOR IT.

DON'T FORGET HE IS THE PROFESSOR OF SURGERY. FOR YOUR SAKE I HOPE HE FORGETS THE INCIDENT.



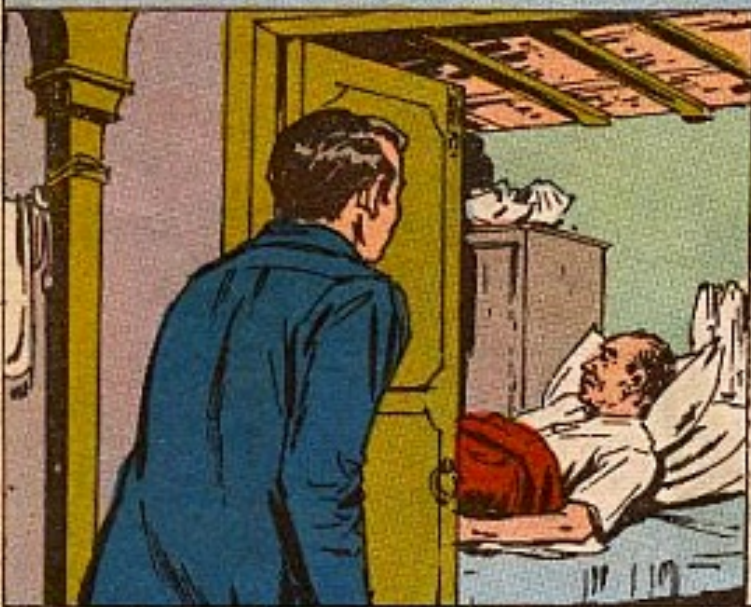


AT THE FINAL MEDICAL EXAMINATION SUBBAROW SECURED GOOD MARKS IN ALL PAPERS EXCEPT SURGERY. HE WAS AWARDED THE LESSER L.M.S. CERTIFICATE INSTEAD OF THE M.B.B.S. DEGREE.

WHAT NEXT? SHOULD I BECOME A PRACTISING DOCTOR OR SHOULD I DEVOTE MY TIME TO RESEARCH? I'LL CONSULT PURUSHOTTAM.



WHEN HE CAME TO RAJAHMUNDRY, HOWEVER...



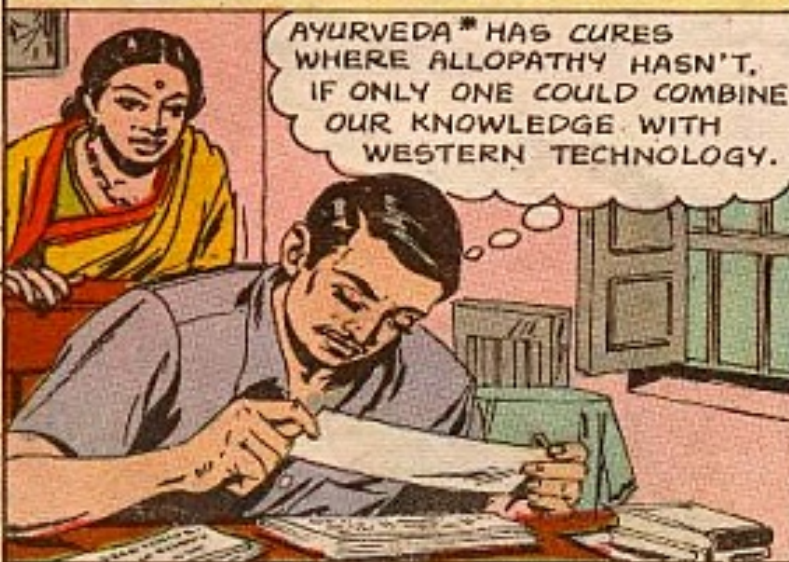
...HE FOUND PURUSHOTTAM BEDRIDDEN WITH TROPICAL SPRUE.



DON'T LOOK SO WORRIED, SUBBUDU! I WILL SOON BE UP AND ABOUT.

BUT PURUSHOTTAM'S CONDITION WAS ACUTE AND HE SUCCUMBED TO THE DISEASE. FOR SUBBAROW THE LOSS WAS IRREPARABLE.

FOR A BRIEF PERIOD HE WORKED IN THE MADRAS AYURVEDIC COLLEGE. DURING THIS PERIOD HIS WIFE JOINED HIM.



AYURVEDA\* HAS CURES WHERE ALLOPATHY HASN'T. IF ONLY ONE COULD COMBINE OUR KNOWLEDGE WITH WESTERN TECHNOLOGY.

HE WROTE TO DR. RICHARD STRONG OF HARVARD UNIVERSITY'S SCHOOL OF TROPICAL MEDICINE AND RECEIVED A PROMPT REPLY.

HMM! THEY ARE NOT INTERESTED IN AYURVEDA. YET HE WOULD HAVE ME OVER THERE TO DO RESEARCH IN TROPICAL DISEASES ... WELL...



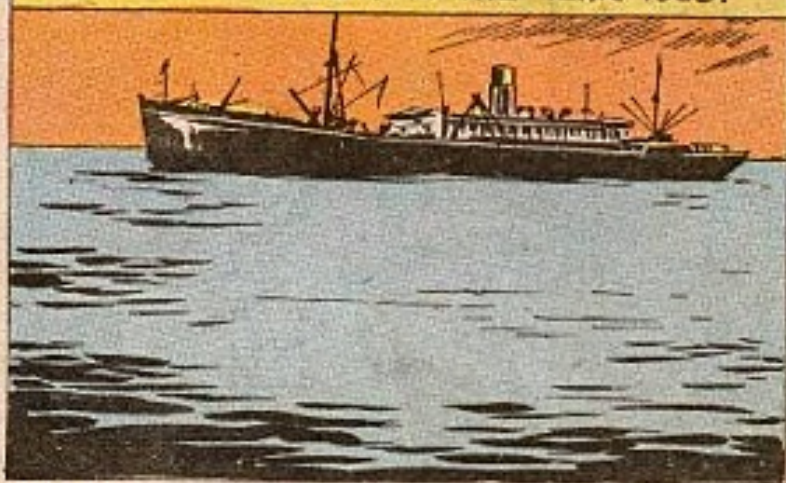


HE DECIDED TO ACCEPT DR. STRONG'S OFFER.

NOW I HAVE TO CONVINCE SESHAGIRI ...AND RAISE SOME MONEY...



WITH GREAT RELUCTANCE SESHAGIRI GAVE HER CONSENT. A LOCAL TRUST \* OFFERED A SMALL SCHOLARSHIP. AND SUBBAROW LEFT FOR THE U.S.A. IN THE YEAR 1923.



HE WALKED INTO DR. STRONG'S OFFICE AT BOSTON, WITH ONLY A HUNDRED DOLLARS IN HIS POCKET, FIFTY SHORT OF THE ADMISSION FEE. WHEN DR. STRONG HEARD HIS STORY —

USE THIS, PAY THE FEES AND ENROLL YOURSELF.

THANK YOU, SIR.



HOW WILL YOU TAKE CARE OF YOURSELF?

I'LL FIND A JOB, SIR.

IN THOSE DAYS INDIAN DOCTORS WERE NOT ALLOWED TO PRACTISE MEDICINE IN AMERICA. THE ONLY JOB SUBBAROW COULD GET IN A HOSPITAL WAS THAT OF WASHING UP URINALS AND BED-PANS. HE ACCEPTED IT.





YET HE MANAGED TO FIND TIME TO STUDY AND PASSED THE REQUIRED EXAMINATION. HE WAS AWARDED THE DIPLOMA IN TROPICAL MEDICINE.

WHAT ARE YOUR PLANS NOW?

THERE ARE SO MANY TROPICAL DISEASES FOR WHICH NO CURE HAS YET BEEN FOUND. I INTEND TO DO RESEARCH IN THAT FIELD.



GOOD LUCK TO YOU. I AM LEAVING FOR SOUTH AMERICA ON AN EXPEDITION.



THAT YEAR SUBBAROW ENROLLED HIMSELF FOR A SUMMER COURSE IN BIO-CHEMISTRY AT THE HARVARD SCHOOL OF MEDICINE AND WORKED UNDER PROF. FISKE.

SUBBAROW, WE ARE TRYING TO PERFECT THE METHOD OF ANALYSING BLOOD, URINE AND TISSUE FOR PHOSPHORUS.



YOUR FIRST TASK IS TO DISCOVER A FAST-WORKING CHEMICAL THAT HELPS TO ESTIMATE THE PHOSPHORUS CONTENT IN TISSUES.



SUBBAROW WORKED HARD. HE ENTERED HIS LABORATORY AT EIGHT IN THE MORNING AND LEFT IT ONLY WELL PAST MIDNIGHT. AT LAST —

I'VE FOUND THE ANSWER. THIS CHEMICAL GIVES THE DESIRED RESULT IN LESS THAN A MINUTE.

BUT THAT CHEMICAL IS DIFFICULT TO PREPARE. WE NEED SOMETHING SIMPLER





FISKE WAS METICULOUS TO A FAULT, A HARD TASKMASTER AND DIFFICULT TO PLEASE. SUBBAROW WORKED DAY AND NIGHT FOR THE NEXT FOUR MONTHS AND CAME UP WITH THE RIGHT CHEMICAL.

DR. FISKE, I'VE FOUND IT. THIS HAS STOOD ALL TESTS, AND IS AVAILABLE IN THE MARKET.

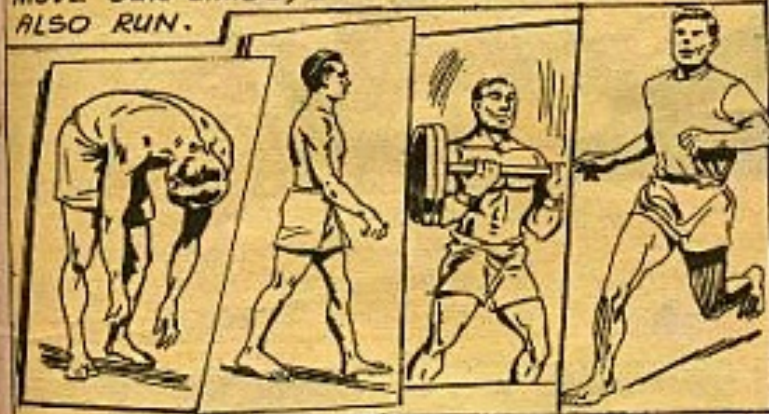


EXCELLENT, SUBBAROW! WE CAN NOW PUBLISH THE RESULTS.



ONE OF THE FIRST LESSONS A STUDENT OF BIO-CHEMISTRY LEARNS TODAY IS THE FISKE-SUBBAROW METHOD OF MEASURING PHOSPHORUS IN THE PREPARED TISSUE.

WHEN THE HARVARD MEDICAL SCHOOL REOPENED, SUBBAROW WAS ACCEPTED AS A POST-GRADUATE STUDENT. ONE OF THE PROJECTS HE TOOK UP WAS ABOUT THE SOURCE OF ENERGY WHICH HELPS US MOVE OUR LIMBS, LIFT WEIGHTS AND ALSO RUN.



THE FISKE-SUBBAROW INVESTIGATION LED TO THE DISCOVERY OF A SUBSTANCE IN THE HUMAN BODY CALLED PHOSPHOCREATINE.

WHEN I PUT A MUSCLE TO WORK BY ELECTRIC STIMULATION THE PHOSPHOCREATINE LEVEL BEGINS TO FALL.



IT COMPLETELY DISAPPEARS WHEN I CUT OFF THE BLOOD SUPPLY AND DRIVE THE MUSCLE TO THE POINT OF FATIGUE BY CONTINUED ELECTRIC STIMULATION.



AND IT REAPPEARS WHEN THE MUSCLE IS ALLOWED A PERIOD OF REST!





IN OTHER WORDS  
THE PRESENCE OF  
PHOSPHOCREATINE  
ENABLES YOU  
TO WORK.

AS YOU WORK  
YOU LOSE IT.  
BUT AFTER A  
PERIOD OF  
REST YOU  
REGAIN IT AND  
ARE READY  
TO WORK.



COULD PHOSPHOCREATINE  
BE THE SOURCE OF  
ENERGY ?

WE'LL HAVE  
TO EXPERIMENT  
FURTHER AND  
SEE.



HOWEVER, ONE THING IS NOW  
CERTAIN. GLYCOGEN IS NOT  
THE SOURCE OF ENERGY AS  
BELIEVED BY HILL  
AND  
MEYERHOFF.



DR. HILL OF LONDON UNIVERSITY AND PROF.  
MEYERHOFF OF GERMANY HAD WON THE NOBEL  
PRIZE IN 1922 FOR THEIR THEORY THAT GLYCOGEN  
IS THE SOURCE OF MUSCULAR ENERGY.

FISKE HOWEVER ANNOUNCED THE DISCOVERY OF  
PHOSPHOCREATINE. THE AMERICAN MEDICAL  
ASSOCIATION JOURNAL HAILED THE DISCOVERY  
IN AN EDITORIAL.

BUT DR. HILL CONTINUES  
TO BELIEVE THAT  
GLYCOGEN IS THE  
SOURCE OF  
MUSCULAR  
ENERGY.

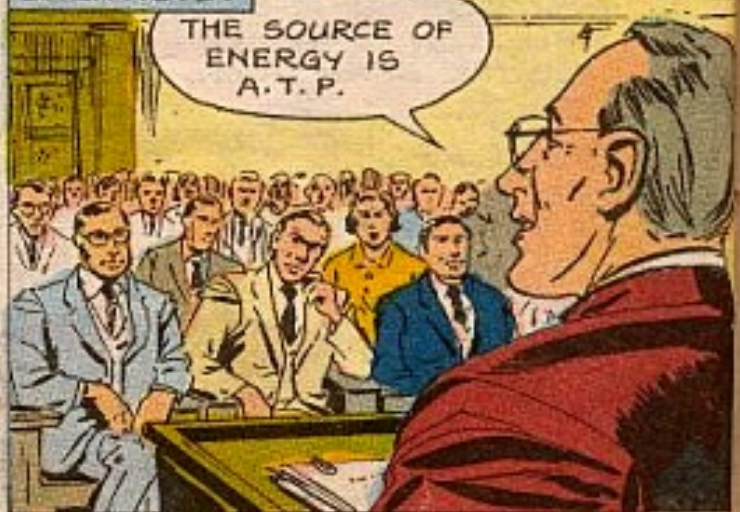


I WONDER  
WHAT  
MEYERHOFF  
THINKS.

MEYERHOFF HAD SEEN THE IMPORTANCE OF  
THE PHOSPHOCREATINE DISCOVERY AND  
PLUNGED INTO FOLLOW-UP STUDIES.

PROF. FISKE AND SUBBAROW ALSO CONTI-  
NUED TO WORK. FINALLY THEY FOUND THE  
ANSWER TO THE ENERGY PUZZLE. FISKE  
ANNOUNCED THEIR DISCOVERY AT AN  
INTERNATIONAL CONFERENCE OF  
SCIENTISTS.

THE SOURCE OF  
ENERGY IS  
A.T.P.





A FEW DAYS LATER —

SUBBAROW, READ THIS JOURNAL. IT'S FROM GERMANY. KARL LOHMANN OF MEYERHOFF'S LABORATORY HAS ANNOUNCED THE DISCOVERY OF A.T.P. ...

REALLY?

AND THIS JOURNAL WAS PUBLISHED SIXTEEN DAYS BEFORE OUR ANNOUNCEMENT AT THE CONFERENCE. THEY HAVE BEATEN US TO IT.

IT IS THE DISCOVERY THAT MATTERS, NOT THE DISCOVERER.

SUBBAROW BY NOW HAD MADE MANY FRIENDS. ONE OF THEM WAS GORDON ALLES, A YOUNG SCIENTIST.

I'M WORKING WITH DR. COHN ON A CURE FOR PERNICIOUS ANAEMIA.

DON'T DAILY DOSES OF BROILED LIVER WORK?

DO YOU WANT TO KNOW HOW OUR PATIENTS REACT TO IT? COME, I'LL SHOW YOU.

AT THE WARD —

UGH! I FEEL LIKE BRINGING UP. I CAN'T SWALLOW IT.

IT IS A MEDICINE, NOT A DELICACY! COME ON, OPEN YOUR MOUTH.



CAN'T YOU GIVE  
ME AN INJECTION  
INSTEAD?



LATER —

ISOLATE THE  
SUBSTANCE IN  
LIVER THAT CURES  
ANAEMIA AND THERE!  
THE PATIENTS HAVE  
THEIR INJECTION!

THAT'S WHAT WE'VE  
BEEN TRYING TO DO.  
BUT, NO LUCK. WHY  
DON'T YOU HELP  
US OUT?



THE TASK FASCINATED SUBBAROW.

I WOULD LOVE TO WORK ON  
THIS PROJECT. THE CURE  
FOR PERNICIOUS ANAEMIA  
COULD ALSO BE THE CURE  
FOR TROPICAL SPRUE....



... WHICH KILLED MY  
BROTHER, BACK IN  
INDIA.

OH!



PERNICIOUS ANAEMIA AND TROPICAL SPRUE  
ARE SO ALIKE IN THEIR SYMPTOMS THAT MEDI-  
CAL MEN BELIEVED THEY HAD A COMMON CURE.

SUBBAROW DECIDED TO CONDUCT  
EXPERIMENTS ON ANIMALS.

COME,  
LET'S GO AND  
GET SOME  
LIVER.

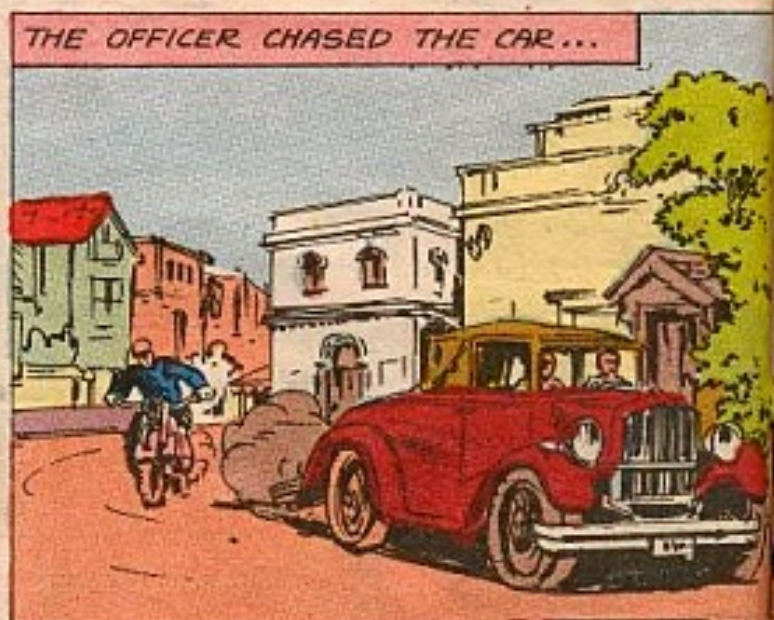


WHAT CAN I DO  
FOR YOU, SIR?

WE WANT  
SOME LIVER.











SUBBAROW DUTIFULLY OBEYED.




WHAT! LIVER! ARE YOU SURE NOTHING IS HIDDEN IN THESE?



THERE IS SOMETHING HIDDEN IN THERE.

WHAT IS IT?



THAT I'LL TELL YOU WHEN I FIND OUT.


AND SUBBAROW AND HIS ASSISTANT DROVE AWAY LEAVING THE OFFICER PERPLEXED.

SUBBAROW WORKED WITH A JUNIOR SCIENTIST, JACOBSON, ON THE PROJECT. THE PROGRESS WAS VERY SLOW BECAUSE SUBBAROW DID NOT HAVE THE NECESSARY EQUIPMENT FOR SUCH A DIFFICULT PROJECT.

JACOBSON, HOW I WISH I HAD A WELL-EQUIPPED LAB WHERE I COULD WORK AS I PLEASED.

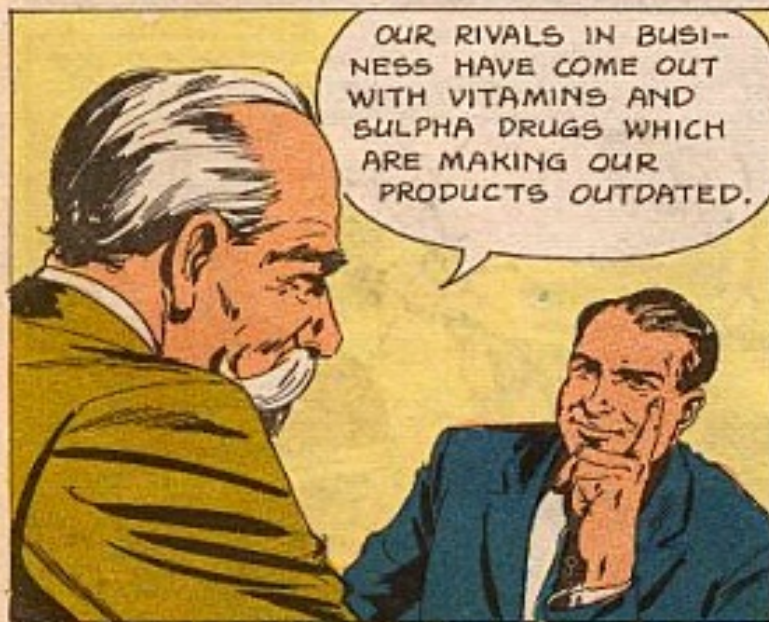
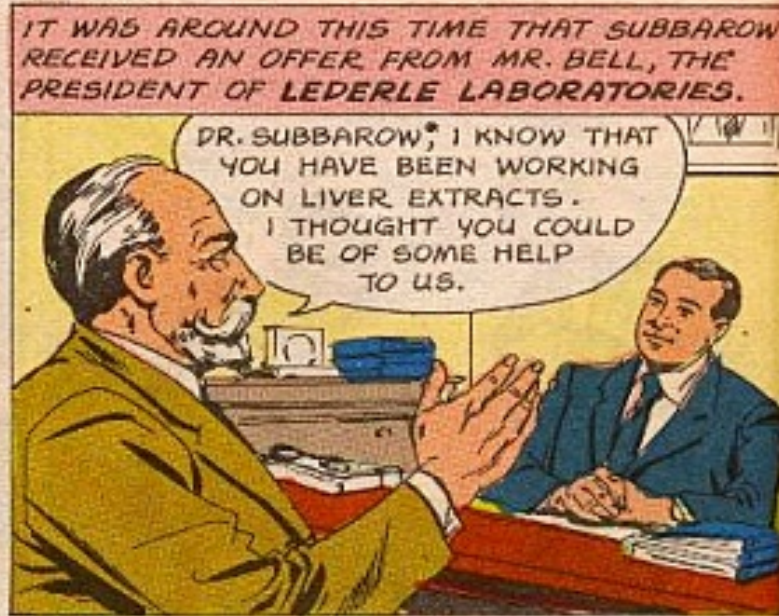
AND WITH A LIBERAL BUDGET!

AT LAST SUBBAROW AND JACOBSON CAME OUT WITH A LIVER EXTRACT WHICH COULD BE INJECTED.



THANK GOD I DON'T HAVE TO EAT RAW LIVER ANYMORE!







...FOR HALF THE AMOUNT PROVIDED...



...YOU SET UP A WELL-EQUIPPED RESEARCH LABORATORY WHERE I CAN WORK AS I WANT.



IT'LL BE DONE.



I'LL TAKE UP THE JOB THE DAY IT IS READY.



THE DAY SOON CAME WHEN SUBBAROW LEFT HARVARD AFTER SEVENTEEN YEARS OF OUTSTANDING RESEARCH WORK.

HERE IS THE LAB YOU WANTED.



IN 1940 SUBBAROW JOINED LEDERLE LABORATORIES AS AN ASSOCIATE DIRECTOR OF RESEARCH.

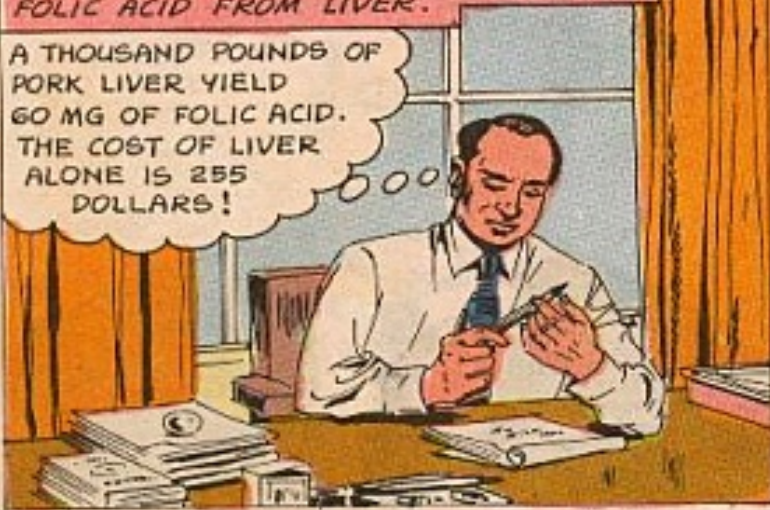
BOYS, WHEN YOU WORK FOR ME, I DON'T KNOW IF YOU WILL GROW RICH BUT YOU SHALL HAVE THE WEALTH OF OPPORTUNITY.





AMONG THE SEVERAL PROJECTS TAKEN UP BY THE SUBBAROW TEAM WAS THE EXTRACTION OF THE VITAMIN CALLED FOLIC ACID FROM LIVER.

A THOUSAND POUNDS OF PORK LIVER YIELD 60 MG OF FOLIC ACID. THE COST OF LIVER ALONE IS 255 DOLLARS!



WE CANNOT AFFORD SUCH COLOSSAL EXPENDITURE. IF WE COULD SYNTHESISE FOLIC ACID...



ONE OF THE GROUPS SUCCEEDED IN FINDING OUT THE BASIC STRUCTURE OF FOLIC ACID.

THE THREE BASIC COMPONENTS ARE FOUND SEPARATELY IN YELLOW PIGMENTS OF BUTTERFLIES, IN WHEAT AND IN YEAST.

THEN SYNTHESISE THOSE THREE COMPONENTS AND PROCEED WITH THE SYNTHESIS OF FOLIC ACID.



IT WAS NOT EASY TO FIND THE RIGHT COMBINATION TO GET FOLIC ACID. OVER A DOZEN CHEMISTS WORKED ROUND THE CLOCK FOR A YEAR. THEN ONE DAY —

COY WALLER, ANY PROGRESS?

NO, DR. SUBBAROW. WE HAVE TRIED ALL COMBINATIONS BUT WITH NO RESULTS.



WHERE DO YOU GET STUCK?







SUBBAROW HAD NO HESITATION IN SANCTIONING THE UNUSUAL PROCEDURE.



A FEW DAYS LATER DR. SUBBAROW SENT FOR COY WALLER.





THE NEW MEDICINE HAD TO BE TRIED ON PATIENTS SUFFERING FROM ANAEMIA AND TROPICAL SPRUE. ONE OF THE FIRST REPORTS RECEIVED WAS FROM DR. CASTLE.

BAD NEWS. FOLIC ACID IS OF NO USE IN TREATING PERNICIOUS ANAEMIA.

OH!

BUT WHEN REPORTS FROM ANOTHER QUARTER CAME IN —

DR. DARBY HAS DECLARED IT A WINNER — IT CURED TROPICAL SPRUE.

SO, AT LAST WE HAVE THE CURE FOR SPRUE WHICH KILLED MY BROTHER!

IN THE SCIENTIFIC PAPER ANNOUNCING THE FOLIC ACID SYNTHESIS, SUBBAROW CLAIMED NO SPECIAL CREDIT. HE GAVE HIS NAME AS ONE OF THE SIXTEEN SCIENTISTS WHO WERE ASSOCIATED WITH THE PROJECT.

THE ACHIEVEMENTS OF SCIENCE ARE BUILT ON THE EFFORTS OF MANY.


AFTER A FEW MONTHS, THE DISCOVERY OF FOLIC ACID LED TO THE DISCOVERY OF VITAMIN B12 BY ANOTHER PHARMACEUTICAL COMPANY.

MEANWHILE A TEAM OF SCIENTISTS UNDER SUBBAROW WAS BUSY WITH THE SEARCH FOR A CURE FOR THE DREADED DISEASE, FILARIASIS. THOUSANDS OF AMERICANS HAD CONTRACTED THIS DISEASE WHEN THEY HAD BEEN POSTED IN THE TROPICAL ISLANDS OF THE PACIFIC DURING WORLD WAR II.

DOCTOR, PLEASE DO SOMETHING FOR ME. I'M GOING THROUGH HELL.

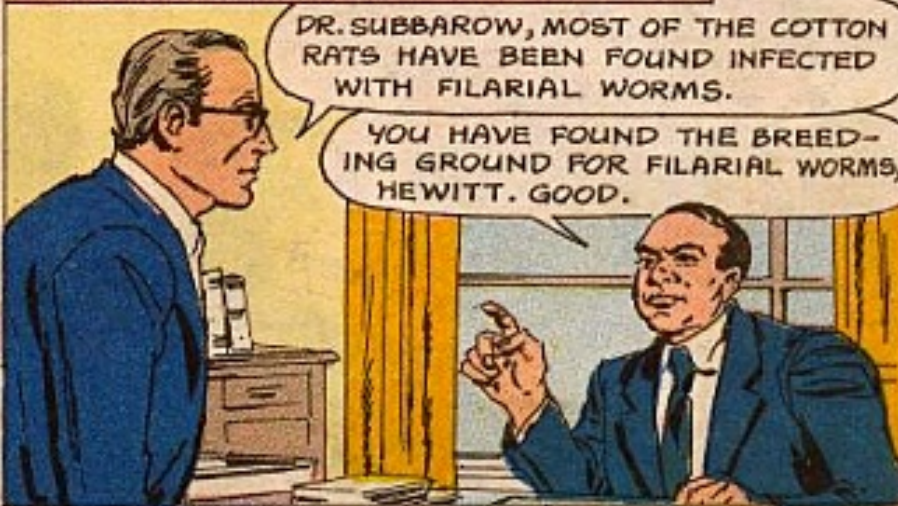
I AM TRYING MY BEST. DON'T WORRY. CONTINUE WITH THE MEDICINE I HAVE GIVEN.






MEDICINE? I WONDER WHEN WE'LL EVER FIND A CURE FOR THIS DISEASE.

BUT SUBBAROW WOULD NOT GIVE UP THAT EASILY. IN SPITE OF THE PROGRESS BEING SLOW HE HAD KEPT THE PROJECT ALIVE. THEN ONE DAY —



DR. SUBBAROW, MOST OF THE COTTON RATS HAVE BEEN FOUND INFECTED WITH FILARIAL WORMS.

YOU HAVE FOUND THE BREEDING GROUND FOR FILARIAL WORMS, HEWITT. GOOD.



AND I HOPE YOU WILL ALSO FIND THE CHEMICAL THAT WILL DESTROY THOSE WORMS.

I'LL TRY.


THE INITIAL TEST BEGAN ON TWENTY RATS PER WEEK.



FIVE HUNDRED AND SEVENTEEN CHEMICALS WERE TESTED AND IT REACHED A STAGE WHEN TWO HUNDRED RATS WERE TREATED PER WEEK.

DR. SUBBAROW, THE RATS KEEP DYING. NONE OF THE CHEMICALS TRIED SO FAR HAS PROVED EFFECTIVE.

DON'T GIVE UP, HEWITT. KEEP TRYING.



AND BRING ME THE RAT THAT SURVIVES.





EXTENSIVE CLINICAL TRIALS PROVED THE NEW DRUG \* TO BE EFFECTIVE TO A GREAT EXTENT.





AT NO TIME EXCLUSIVELY INVOLVED IN ONE SINGLE PROJECT, SUBBAROW TURNED HIS ATTENTION TO OTHER DISEASES.

I WOULD LIKE TO HAVE A MEDICINE WHICH IS EFFECTIVE AGAINST NOT JUST ONE DISEASE BUT SEVERAL.

YOU MEAN AN ANTIBIOTIC FOR A WIDE RANGE OF INFECTIONS?

YES. LET'S EXAMINE ALL THE POSSIBLE SOURCES OF ANTIBIOTICS.

IT WAS EASIER SAID THAN DONE. IT TOOK FOUR YEARS OF HARD WORK WITH MANY MOMENTS OF DESPAIR AND FRUSTRATION BEFORE SUBBAROW'S TEAM CAME OUT WITH THE ANTIBIOTIC-YIELDING MICROBE WHICH SUBBAROW WAS LOOKING FOR.

AT LAST WE HAVE FOUND IT!

CONGRATULATIONS, DR. DUGGAR.

AFTER EXTENSIVE TESTS AT THE LABORATORY, THE NEW DRUG, THE GOLDEN COLOURED TETRACYCLINE\* WAS READY FOR CLINICAL TRIAL.

DR. SUBBAROW, NO DOCTOR IS PREPARED TO TRY OUR DRUG ON HIS PATIENTS.

I THOUGHT ONLY BACTERIA WOULD BE SCARED OF OUR NEW DRUG, NOT DOCTORS!

THEN SUBBAROW CALLED ON DR. LOUIS WRIGHT OF HARLEM HOSPITAL, NEW YORK.

DR. WRIGHT, I'VE A DRUG NO ONE IS WILLING TO USE. I HAVE FAITH IN IT. WOULD YOU GIVE IT A TRIAL?

YES, I HAVE A PATIENT WHO IS SUFFERING FROM A VIRAL DISEASE FOR WHICH NO ONE HAS A CURE.

HE HAS NOTHING TO LOSE BY TRYING YOUR 'MIRACLE' DRUG.

MARKETED FOR THE FIRST TIME UNDER THE NAME, AUREOMYCIN



INDEED THE NEW ANTIBIOTIC DID TURN OUT TO BE A MIRACLE DRUG.

YES, DR. WRIGHT ?

MY PATIENT IS CURED. SEND SOME MORE OF YOUR NEW MEDICINE.

THE TETRACYCLINES NOW AVAILABLE ARE ALL DERIVED FROM THE ONE DEVELOPED BY SUBBAROW'S TEAM.

IN THE COURSE OF HIS RESEARCHES, SUBBAROW'S ATTENTION HAD BEEN DRAWN TO CANCER TOO. HIS TEAM CAME OUT WITH A MEDICINE CALLED AMINOPTERIN FOR TREATING CANCER OF THE BLOOD IN CHILDREN.

LET'S ARRANGE FOR A CLINICAL TRIAL.

THAT SAME DAY A BOY SUFFERING FROM BLOOD CANCER WAS ADMITTED TO A BOSTON HOSPITAL.

THE BOY WAS TREATED WITH THE NEW MEDICINE AND HE STARTED IMPROVING.

MOTHER, HOW LONG DO I HAVE TO STAY HERE ?

JUST A FEW DAYS MORE, MY BOY.

AT LAST THE TREATMENT WAS OVER AND THE BOY WAS DISCHARGED.

MOTHER, ARE WE GOING HOME TODAY ?

YES, MY DEAR, WE CAN NOW GO HOME.

DOCTOR, HAS MY BOY BEEN CURED ?



TO BE FRANK, NO, MADAM.  
THE TREATMENT HAS  
PROLONGED HIS LIFE  
FOR A FEW MONTHS  
ONLY.

OH!

CAN'T THE MAN WHO  
HAS GIVEN US  
AMINOPTERIN COME  
OUT WITH A  
PERMANENT CURE?

WHY NOT, MADAM?  
GOD WILLING HE  
MAY, BEFORE YOUR  
CHILD HAS A  
RELAPSE.

IN FACT WITHIN A FEW MONTHS SUBBAROW  
AND HIS COLLEAGUES CAME OUT WITH  
METHOTREXATE WHICH WAS EVEN MORE  
EFFECTIVE IN TREATING NOT ONLY BLOOD  
CANCER BUT ALSO OTHER TYPES OF  
CANCER AS WELL.

DR. SUBBAROW,  
WHAT ARE YOUR  
FUTURE PLANS?

I WOULD LIKE TO BUILD  
AN INDEPENDENT CANCER  
RESEARCH UNIT,  
MR. BELL...

... IF YOU  
SANCTION IT.

GO AHEAD,  
DR. SUBBAROW.  
I'LL BACK YOU  
ALL THE WAY.

SUBBAROW FINALISED THE PLANS FOR THE CANCER RESEARCH UNIT.  
HOWEVER, HE DID NOT LIVE TO SEE IT ESTABLISHED. HE DIED OF  
HEART FAILURE AT THE AGE OF FIFTY-THREE.







WUOLINA